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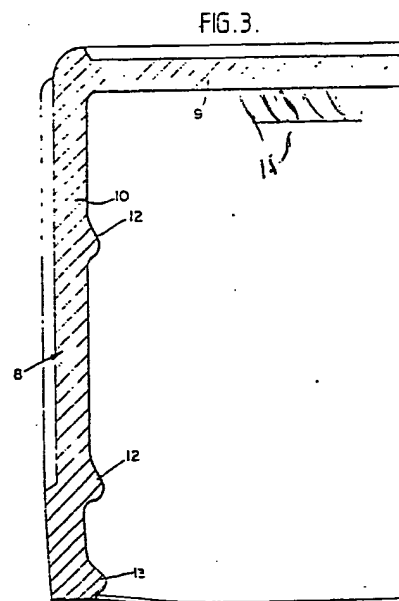
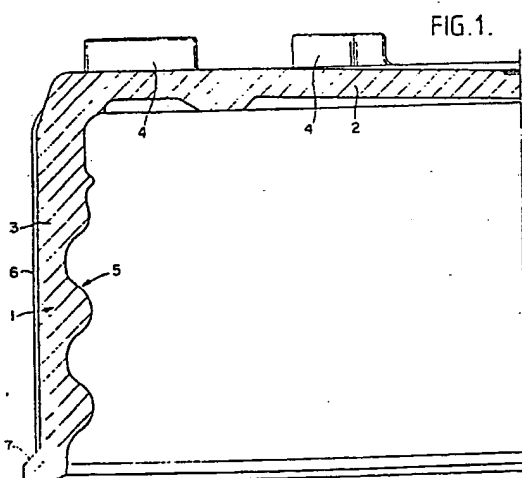
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Selected US specifications from IPC sub-class  
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(54) Double shell closures for containers

(57) A closure for a container comprises a moulded plastics, inner, internally screw-threaded member (1) and a moulded plastics, outer member (8) which cooperates with the inner member to enable the closure to be screwed onto and off a container with child resistant interengagable clutch means (4, 11) therebetween. In order to facilitate production the inner member is jumped off its mould, and the external wall of the inner member is provided with a series of parallel ribs (6) which cooperate with annular beads (12) provided on the internal wall of the outer member in order to minimize the effect of external distortion of the inner member on the cooperation between the two members.



The drawing(s) originally filed was (were) informal and the print here reproduced is taken from a later filed formal copy.  
The claims were filed later than the filing date within the period prescribed by Rule 25(1) of the Patents Rules 1982.

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FIG. 1.

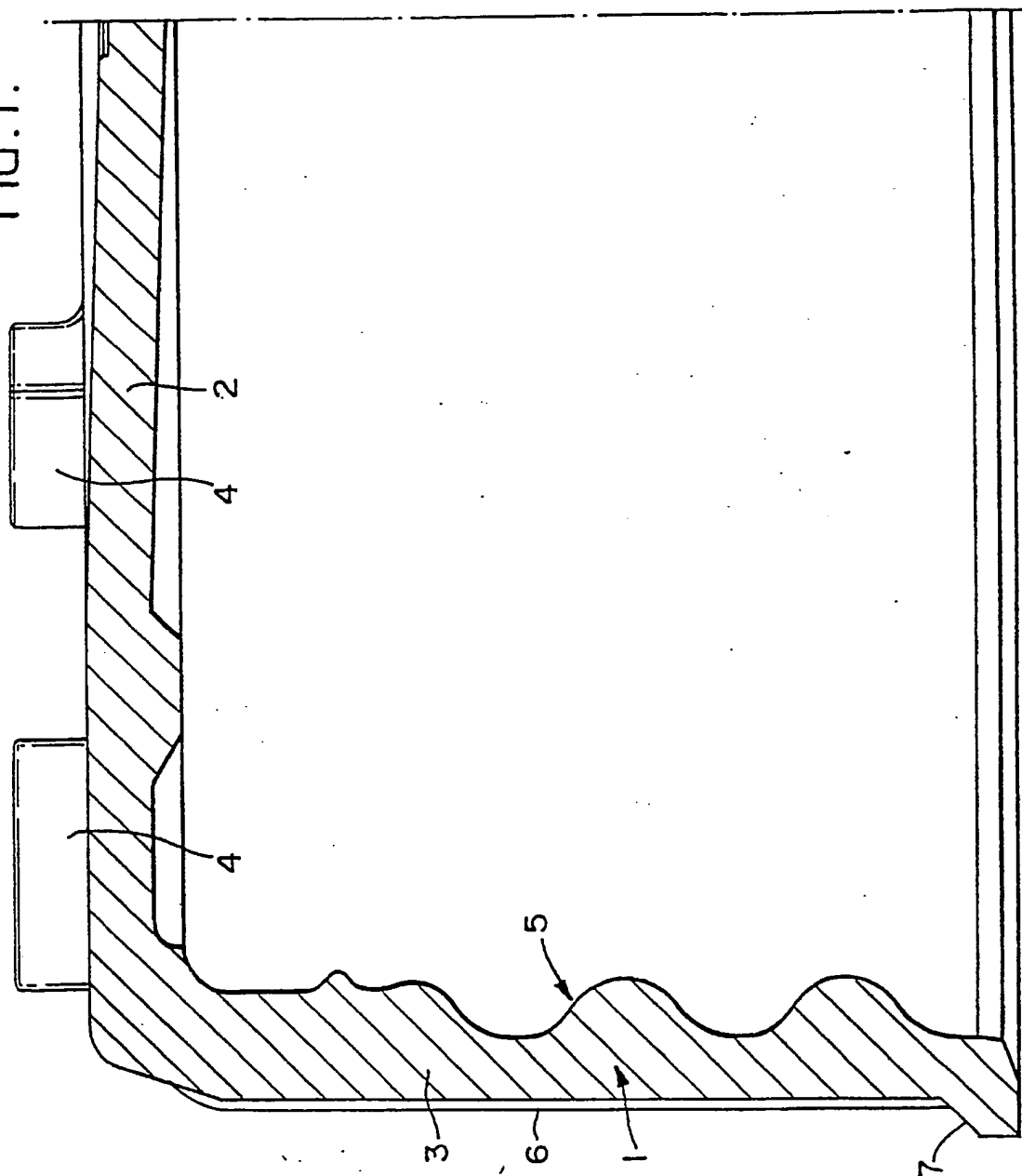


FIG. 2.

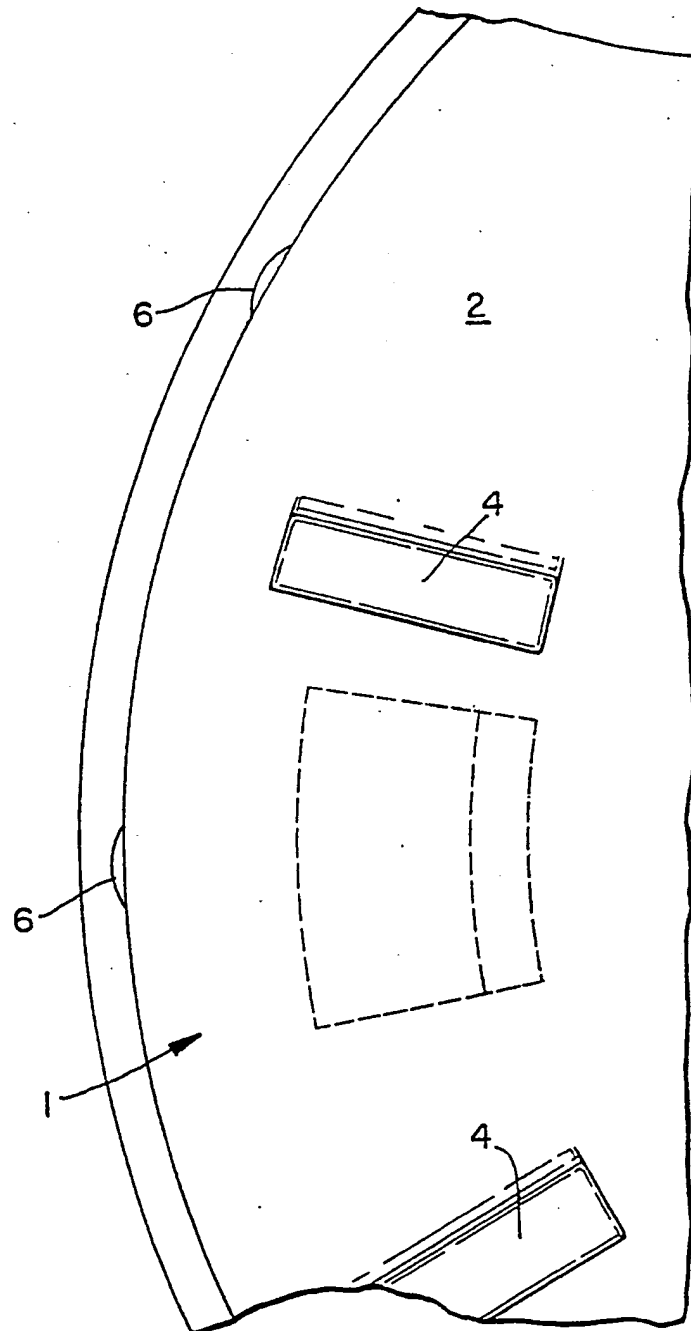
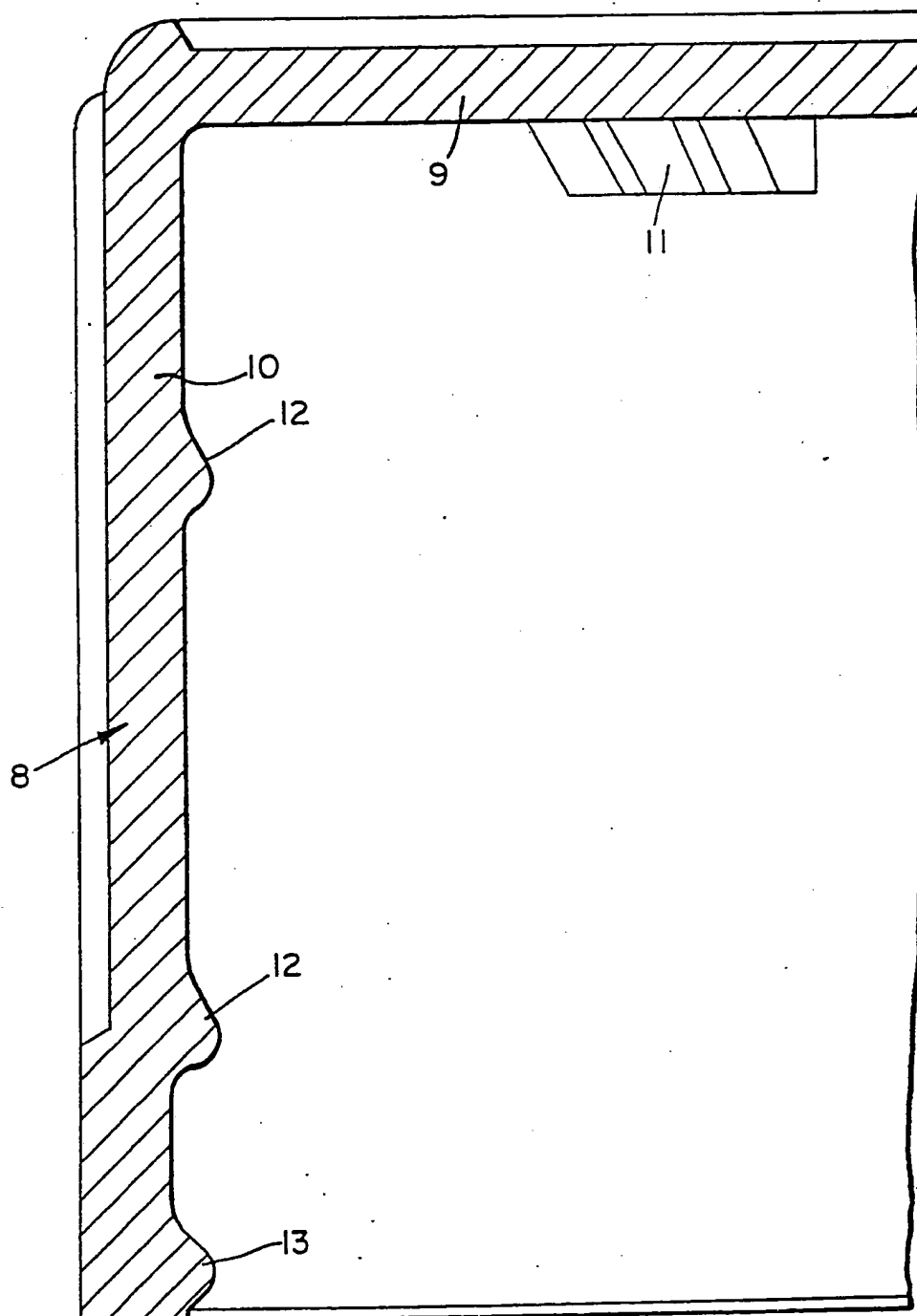


FIG. 3.



TITLE

Improvements in double shell closures  
for containers.

INTRODUCTION

5           This invention relates to double shell  
closures for containers specifically those  
which are known as "child resistant".

Child resistant closures for containers  
which contain pharmaceutical and medical  
10       preparations or toxic substances are well  
known and normally take the form of a double  
shell, the inner and outer members being  
injection moulded separately in plastics and  
then being fitted together.     The  
15       construction of the members is usually such  
that, when assembled, they incorporate some  
form of clutch and demand operation in two  
directions at once, normally downwards and  
anti-clockwise, in order to open the  
20       container.

The containers to which the closures  
are fitted normally have a screw-threaded  
neck and so the inner member of the closure

is compatibly internally screw-threaded.  
This has previously dictated that the inner  
member has to be screwed out of the mould  
after it has been formed to best preserve the  
5 external shape of the member and thus the fit  
of the inner and outer members and operation  
of the closure. This screwed release from  
the mould is time consuming.

Also, having satisfied national test  
10 procedures, it is important that the  
frictional resistance of the outer member  
when rotating around the inner member and the  
frictional resistance of the vertical clutch  
movement is not altered over production  
15 quantities from those samples which passed  
the national test.

OBJECT OF THE INVENTION

It is the main object of this invention  
to provide a double shell closure for a  
20 container which may be injection moulded and  
released from the mould more speedily than  
hitherto.

STATEMENTS OF INVENTION

According to the present invention there is provided a closure for a container comprising an inner internally screw-threaded member and an outer member which co-operates with the inner member to enable the closure to be screwed onto and off a container, both said members being moulded in plastics and the inner member being jumped off its mould during manufacture, in which the external wall of the inner member and the internal wall of the outer member are provided with projecting means whereby the effect of external distortion of the inner member on the co-operation of the two members is minimised.

The said projecting means may be in the form of ribs. The ribs of the inner member may lie parallel to the axis of the inner member to co-operate with one or more circumferential ribs of the outer member. Conveniently, the ribs of the inner member are equally spaced around the circumference thereof. The amount of projection of the

ribs is such that circumferential distortion between the ribs does not contact the internal wall of the outer member and disturb the fit of the two members.

5           Furthermore, both members being slightly flexible, the outer member can accommodate itself to widely spaced ribs which, due to distortion, are diametrically over size whereas a complete circumference  
10 over size would jam in a co-operating circular shell due to interference.

          The outer member, which is traditionally jumped from the mould as external distortion is not critical, may be  
15 provided with two internal circular ribs to co-operate with the widely spaced ribs on the inner member. Contact of each inner member rib is thus reduced to two points only and these points move vertically only the extent  
20 of the clutch movement. All distortion of the ribs, other than at the short distance of travel of the two contact points, does not affect the fit and operation of the two members.



DRAWINGS

Figure 1 is a fragmentary cross-sectional view through an inner member of a closure constructed according to the invention;

Figure 2 is a plan view of Figure 1; and

Figure 3 is a fragmentary cross-sectional view through an outer member of a closure constructed according to the invention.

SPECIFIC DESCRIPTION

The inner member 1 shown in Figures 1 and 2 includes a top portion 2 and a skirt 3. The top portion 2 carries projections 4 which co-operate with other projections on the outer member to form a clutch and to effect the child resistant nature of the closure but these means form no part of the present invention and will not be further described.

Part of the skirt 3 has internal screw-threads 5 to be jumped off its mould after forming.

Arranged symmetrically around the external wall of the inner member 1 are a series of ribs 6 which may be part arcuate in cross-section and extend substantially the entire length of the skirt 3. A convenient number of such ribs is twelve equally spaced around the circumference. External bead 7 prevents the outer member being detached from the inner member after assembly.

Figure 3 shows an outer member for co-operation with the inner member of Figures 1 and 2. The outer member 8 has a top 9 and skirt 10. The underside of top 9 is provided with means 11 which co-operate with the means 4 of the inner member to effect the child resistant feature of the closure and will not be further described.

On the internal wall of the skirt 10 of the outer member 8 are one or more, conveniently two, ribs 12 which are disposed circumferentially around the skirt 10 and which co-operate with i.e., engage the ribs 6 of the inner member 1. The engagement of these ribs 6 and 12 allows the outer member

to interact with the inner member such that in the form of the invention described above contact is made at twelve points only. All external distortion of skirt 3 of inner member 1 caused by pushing the threads 5 out of the mould has no effect on the outer member 8 other than at ribs 6 and so the effect of external distortion of the inner member on the co-operation of the two members is minimised. Furthermore, distortion of ribs 6 does not have any effect on outer member 8 other than at the contact points of outer member ribs 12. Still further, because the outer member 8 can, to some extent, accommodate itself to the twelve contact points with the inner member 1, diametric distortion of the ribs 6 has less effect on rotational friction than diametric variations of cylindrical contact.

20           Bead 13 co-operates with bead 7 on the inner member to prevent detachment after assembly.

CLAIMS

1. A closure for a container comprising an inner, internally screw-threaded member and an outer member which cooperates with the inner member to enable the closure to be screwed onto and off a container, both said members being moulded in plastics, in which the external wall of the inner member and the internal wall of the outer member are provided with elongate projecting means axially inclined with respect to one another to give point contact therebetween whereby the effect of external distortion of the inner member on the cooperation of the two members is minimized.

2. A closure as claimed in Claim 1 wherein said projecting means include a rib on one of said members which makes point contact with a bead on the other of the members.

3. A closure as claimed in Claim 2 wherein a plurality of ribs on the inner member lie parallel to the axis of the inner member to cooperate with one or more internal circumferential beads of the outer member.

4. A closure as claimed in any one of Claims 1 - 3 wherein the outer member is provided with two internal circular beads to cooperate with ribs on the inner member.

5. A method of producing a closure for a container comprising an inner, internally screw-threaded member and an outer member which cooperates with the inner member to enable the closure to be screwed onto and off a container, wherein the members are moulded in plastics and the inner member is jumped off its mould and wherein the external wall of the inner member and the internal wall of the outer member are provided with interengaging projecting means so

that the effect of external distortion of the inner member on the cooperation of the two members is minimized.

6. A method as claimed in Claim 5 wherein said projecting means include a rib on one of said members which makes point contact with a bead on the other of said members.

7. A method as claimed in Claim 6 wherein a plurality of ribs lie parallel to the axis of the inner member to cooperate with one or more circumferential beads of the outer member.

8. A closure for a container, the closure being substantially as hereinbefore described with reference to, and as illustrated in, the accompanying drawings.

9. A method of producing a closure for a container, the method being substantially as hereinbefore described with reference to the accompanying drawings.